

SOME POLYCHÆTOUS ANNELIDS OF THE NORTHERN PACIFIC COAST
OF NORTH AMERICA.

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This paper is a final report embodying the results of a study of all of the Polychæta submitted to me by the U. S. Bureau of Fisheries from the collections made by the steamer Albatross during the summer of 1903. From June 19 to August 24 of that year, while in the service of a special Commission appointed by the President to investigate the salmon fisheries of Alaska, the Albatross cruised northward along the coast from Port Townsend and Vancouver on the south, through part of the labyrinth of straits and passages which separate the islands of southeastern Alaska, as far as Shelekov Strait on the north and west, occupying meanwhile 112 dredging stations and a number of additional hydrographic and towing stations. Some little shore collecting was also conducted.

During the cruise the vessel was under the command of the late Lieut. Franklin Swift, U.S.N., to whose skill in handling her must be largely credited the large number of successful hauls made with trawl and dredge. The extent of the collection and the generally excellent preservation of the annelids similarly attest the energy and ability which Prof. Harold Heath devoted to collecting the invertebrates, placed under his immediate charge.

In all 107 species of Polychæta are represented. Of this number 41 species are considered to be previously undescribed. The descriptions of only two of these, however, appear for the first time in this paper, the remaining 39 having been published, with the courteous approval of the Commissioner, Hon. George M. Bowers, in these *Proceedings* for 1905, pp. 525-569, 846-860, and for 1906, pp. 217-260, together with plates illustrating important diagnostic features.

Supplementing the results of the study of the Albatross collections are added some notes on a few polychætes in the collection of this Academy, gathered by Dr. Benjamin Sharp at Icy Cape¹ and Unalaska,

¹ The northernmost point of that name.

Alaska; by Mr. A. E. McIlhenny at Point Barrow, Alaska, and by Mr. George Dawson at Admiralty Inlet, Washington. From this source are added 7 species not otherwise represented, 2 of them having been described as new in these *Proceedings* for 1906, pp. 352-355. The total number of species considered is, therefore, 114.

After deducting the 43 new species, the 71 remaining may be classified from the point of view of geographical distribution as follows: 16, so far as known, are confined to the region under consideration, having been reported from some part of it, but not elsewhere, by previous writers; 12 occur to the southward along the coast of California, though most of them have already been recorded from Puget Sound or the Gulf of Georgia by Johnson and others; 8 have been described as occurring off the coast of Japan, and probably all of the latter have, as several are known to have, a wide distribution throughout the North Pacific; 4 are scattering; and the remaining 31 are well-known inhabitants of northern Europe, Greenland and the Arctic regions generally. Many of the latter are established circumpolar forms and have been already reported by Marenzeller or Wren as belonging to the fauna of Bering Sea, or by others as occurring in the North Pacific.

In not a few cases it is evident that the individuals referred to such species differ in certain respects from their European representatives. In a few species like *Terebellides stramii* individuals of almost every colony present certain characteristic differences. In the belief that the future will show that such wide-ranging species split up into many geographical subspecies just as land animals do, and that such subspecies cannot be satisfactorily discriminated until our knowledge of the distribution and variation of annelids shall have been very greatly augmented, it has been thought best to merely mention such differences, without giving to them nomenclatorial importance.

In this report it has been thought sufficient to the purpose to record only the general location of the stations, together with the depth of water and the character of the bottom. The full data relating to each station, including its exact location, have been carefully compiled by Mr. Henry C. Fassett and published in the *Report of the U. S. Fish Commission* for 1903, pp. 123 to 138.

Except in the two or three cases where it is stated otherwise, all types have been forwarded to the U. S. National Museum. Cotypes, whenever such exist, are deposited at the Academy of Natural Sciences of Philadelphia. The references given under each species are either to its original description or to later accounts furnished with good figures and synonymies.

SYLLIDÆ.

Syllis armillaris (Müller) Malmgren.

Nereis armillaris Müller, Zoologiæ danicæ prodromus, 1776, p. 217.

Syllis armillaris, Malmgren, Annulata Polychæta, 1867, p. 42, Tab. VII, fig. 46.

Syllis borealis Malmgren, *ibid.*, p. 42, Tab. VI, fig. 42.

Typosyllis armillaris, Marenzeller, Ann. K. K. Naturh. Hofmuseums, V (1890), p. 3.

Two small and immature examples 11 mm. long agree well with the descriptions cited above and bear out fully Marenzeller's conclusions concerning the synonymy of the species and confirm his record of its occurrence in Bering Sea. One specimen is beautifully marked with dainty transverse lines of dark brown or black pigment; there being two lines across each segment as far as XV and beyond that point one line to the middle of the body. The accessory tooth at the tip of the setæ, which was overlooked by Malmgren, is almost always present. The median tentacle has 15 joints, the paired tentacles 11 to 14 joints, the dorsal and ventral peristomial cirri 15 and 10 respectively, the first dorsal cirrus (somite II) 18 joints, the middle dorsal cirri 9 to 14 joints, with the greatest diameter at the 4th or 5th, and the caudal cirri 14 joints. In one specimen the gizzard extends from somite XIII to XXII.

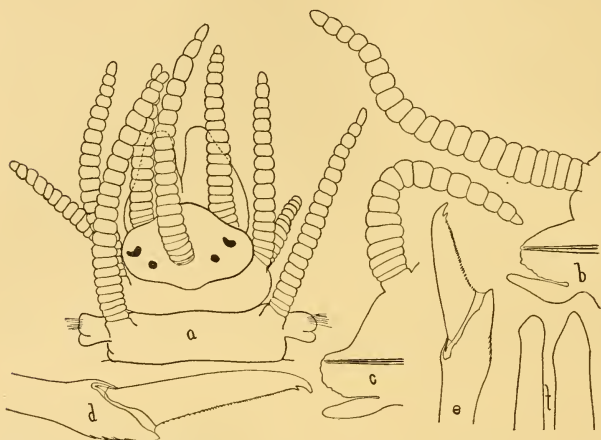
Stations 4261, Dundas Bay, Icy Strait, Alaska, July 24, 8½–10 fathoms, green mud and rocks; 4289, Uyak Bay, Kadiak Island, Alaska, 74–80 fathoms, gray mud.

Syllis alternata new species.

The type and largest example (from Station 4228) is 30 mm. long with 160 segments, the posterior 28 of which are filled with eggs, without, however, exhibiting any sign of stolonization. Other examples are from 16 to 20 mm. long with from 116 to 125 segments. The form is slender and the diameter nearly uniform, the body slightly widened to about XX, strongly arched above and flattened below. The segments are all sharply defined and very short, usually 6 to 8 times as wide as long.

The prostomium (*a*) is about 1½ times as wide as long, as shown in the figure of a cotype, but may be partly concealed beneath a fold of the peristomium. Slight anterior and posterior contractions give the effect of prominently bulging sides. The palpi are about twice the length of the prostomium, project prominently straight forward and are narrow distally. Of the two pairs of small reddish-brown eyes, the anterior are larger, decidedly farther apart and crescentic or bean-shaped as seen from above. In the type specimen the two pairs of eyes are closer together but not larger than in the smaller specimens.

All of the appendages are strongly moniliform. The tentacles are rather stout but gently tapered. The median arises between the eyes, is nearly twice the length of prostomium and palpi and consists of 22 to 30 joints. The lateral tentacles arise from the antero-lateral face of the prostomium, are $1\frac{1}{2}$ times as long as the latter plus the palps and consist of about 20 joints. The peristomial cirri are quite similar in form, the dorsal consisting of about 20 to 25 joints and equalling the median tentacle and the ventral consisting of 15 joints and equalling



Syllis alternata—*a*, cephalic region from above, $\times 24$; *b*, parapodium X, $\times 32$; *c*, parapodium LI, $\times 32$; *d*, a moderately long-bladed seta from the dorsal part of parapodium X, $\times 600$; *e*, a short-bladed seta from the ventral part of the same, $\times 600$; *f*, ends of two aciculae, $\times 600$.

the lateral tentacle in length. The first dorsal cirrus is very long, especially on the type, in which it has about 35 joints.

The parapodia (*b* and *c*) are rather stout and short, blunt and broadly rounded distally. Ventral cirri are slender, unjointed, little tapered and reach beyond the end of the neuropodium. The dorsal cirri, on the other hand, are all very strongly moniliform and gently tapered throughout. They are longest and nearly uniform on the anterior 15 segments, on which they nearly equal the diameter of the body. Farther back they are alternately long and short, but never equal to the anterior ones. From about 25 and 18 respectively in this region the number of joints becomes reduced at the caudal end quite rapidly

until on the last but one remains. In the several specimens the caudal cirri have from 16 to 25 joints.

No notopodial aciculum is present, but there are usually 3 neuropodials (*f*) with knobbed ends of various forms. The neuropodial setæ usually number about 10, disposed in 3 or 4 ranks. They are colorless, homogeneous, and rather milky vitreous in appearance. The rather stout stems have 4 or 5 minute teeth on the convexity of the enlarged ends (*d* and *e*) which are strongly oblique and possess a well-developed socket. The appended blades of the dorsalmost setæ (*d*) are quite long, some of those of the anterior segments exceeding by $\frac{1}{4}$ the one figured. The ventral and posterior ones are shorter (*e*), and some of the shortest are claw-like and little exceed the obliquity of the end of the shaft in length. The end is strongly hooked, the accessory tooth well developed, and the marginal fringe very fine.

In one specimen the protruded proboscis is a short and nearly cylindrical cup bearing 10 prominent soft marginal papillæ. In another the gizzard lies in somites IX to XXI, in still another in XIX to XXXVII. The cuticle of this species is noticeably thick. No trace whatever of color remains.

Station 4228 (type), vicinity of Naha Bay, Behm Canal, southeastern Alaska, 41–134 fathoms, gravel and sponges; 4235, vicinity of Yes Bay, Behm Canal, 130–193 fathoms, gray mud; 4261, Dundas Bay, Icy Strait, Alaska, $8\frac{1}{2}$ –10 fathoms, gray mud and rocks.

Syllis (*Chaetosyllis*) *quaternaria* Moore.

Syllis quaternaria Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 352–354 (text fig.).

This epitokous form of the type for which Malmgren established his genus *Chaetosyllis* is probably a true *Syllis*, though it cannot be correlated with any known non-sexual form. The type and about a score of other specimens are No. 1091 of the Academy's collection. They were taken by A. E. Møllhenny at the "surface in a lead four miles from shore" at Point Barrow, Alaska.

***Pionosyllis magnifica* Moore.**

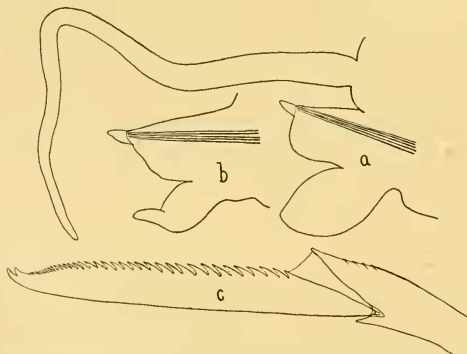
Pionosyllis magnifica Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 223–225, Pl. X, figs. 9–11.

This large and handsome syllid is represented by two specimens, one (the type) coming from Station 4219, Admiralty Inlet, vicinity of Port Townsend, Washington, 16–26 fathoms, green mud, sand and broken shells; the other from Station 4241, Kasaan Bay, Prince of Wales Island, southeastern Alaska, 50–51 fathoms, green mud.

***Pionosyllis gigantea* new species.**

Three fragments of the anterior end, the largest comprising but 40

segments, represent a species much larger than *P. magnifica*, from which it is distinguished by numerous characters. The type, consisting of 40 segments, is 16 mm. long, 4 mm. in width of body and 7 mm. between the tips of the setæ. The prostomium is nearly quadrate but slightly wider anteriorly, where the angles are rounded; it is quite deeply cut into two lobes by a median cleft posteriorly. The palpi are broad, flattened, broadly rounded at the ends and slightly exceed the prostomium in length; at the base they are coalesced but diverge widely and curve ventrad distally. The eyes of both pairs are reddish brown, small and round, the anterior very little larger than the posterior and directly in front of them or but little farther apart. The dorsal cephalic appendages are imperfect on all of the specimens, but are evidently slender, tapering, smooth and flagelliform. The middle tentacle is apparently about $3\frac{1}{2}$ times and the lateral tentacles about twice the length of the prostomium and palpi. The former arises



Pionosyllis gigantea—a, parapodium XXV, without setæ, $\times 24$; b, parapodium L, without setæ, $\times 24$; c, a seta with blade of average length, from XXV, $\times 360$.

from the center of the prostomium, the latter from the anterior lateral margins. The very short, slightly flaring proboscis bears 9 or 10 marginal papillæ and apparently is unprovided with a strongly cuticular region.

The peristomium is extremely short above, where it is represented chiefly by a fold of integument which conceals the posterior lobes of the prostomium. At the sides it is better developed and ventrally is crowded forward with the next two segments beneath the prostomium. Its tentacular cirri are similar to the prostomial appendages, the dorsal

about 5 times the length of the head and the ventral only about twice that length. Remaining somites are very short anteriorly, but from the twentieth onward are only 6 or 7 times as wide as long. Dorsally they are strongly arched, ventrally flattened. The intersegmental furrows are well marked, perhaps exaggerated by contraction of the longitudinal muscles.

All of the parapodia (*a* and *b*) are prominent and spring from the lowest level of the sides of the body. Notopodia are entirely wanting, even the acicula appearing to be absent. The neuropodia, on the other hand, are stout, those at the anterior end being nearly truncated, while the more posterior ones are bevelled from the dorsal or acicular angle. All, however, possess slender and prominent presetal papillæ at this angle. Ventral cirri are remarkably large and swollen on the anterior parapodia and end bluntly, but farther back they become reduced in size and more slender and an annular constriction may separate the pointed end as a separate piece.

The most striking characteristic of the species is the great length of the anterior dorsal cirri which form a tangled mass at the sides of the body; they are so easily detached that few of them remain. They arise from rather stout but short cirrophores (*a*) which are not sharply distinguished from the sides of the somites. The styles are smooth, tapering and very slender toward the end, like whiplashes. On one of the smaller specimens, which has 29 segments measuring 8 mm. long, and a maximum body width of 3 mm., the dorsal cirrus of somite IV measures no less than 14 mm. long. The cirri are alternately longer and shorter, and after about the first ten those borne on the even numbered somites are regularly 2 to $2\frac{1}{2}$ times the body width, while those on the odd numbered somites little exceed the body width.

Neuropodia are supported by 5 or 6 acicula which taper gradually almost to the end, where they are slightly curved and end abruptly in short conical points. The setæ (*c*) project rather prominently in usually 5 subacicular ranks of 3 or 4 each. In any one parapodium they are remarkably uniform in length of blade, etc., but the blades become gradually shorter and wider and the shafts stouter from before backwards. The shaft (*c*) exhibits but a slight distal enlargement, but is conspicuously and very unequally bifid, the larger and longer process ending quite acutely and being provided along the front with 4 or 5 obscure teeth. The blades or appendages are rather long, strongly hooked and bifid at the end, and especially noteworthy for the coarseness of their marginal serrations.

With the exception of the prostomium and the dorsal cirri these

annelids are much pigmented both above and below with chocolate brown.

Stations 4199, Queen Charlotte Sound, off Fort Rupert, Vancouver Island, B. C., 68-107 fathoms, soft green mud and volcanic sand; 4228 (type), vicinity of Naha Bay, Behm Canal, southeastern Alaska, 41-134 fathoms, gravel and sponges; 4300, off Shakan, Sumner Strait, southeastern Alaska, 185-218 fathoms, rocks and mud.

***Trypanosyllis gemmipara* Johnson.**

Trypanosyllis gemmipara Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, 1901, pp. 405, 406.

This species is represented in the collection by two specimens. As one of them permits the verification of Johnson's very interesting discovery of collateral budding in this genus, it is unfortunate that the preservation is altogether too imperfect to enable me to describe the conditions fully. The buds are all quite young and occur in several close tufts arranged in a transverse row about 35 segments anterior to the anus, and all on the ventral surface, where the integuments are split open at their place of origin. Collateral budding of a type similar to that described by Johnson in *T. gemmipara* and *T. nigens* has recently been found by Izuka in a Japanese species, *T. misakiensis*, also.

Taken only at Station 4197, Gulf of Georgia, Halibut Bank, 31-90 fathoms, sticky green mud and fine sand.

PHYLLODOCIDÆ.

***Phyllodoce citrina* Malmgren.**

Phyllodoce citrina Malmgren, Ofvers. Kgl. Vet.-Akad. Förh., 1865, p. 95.

Two poorly preserved specimens which agree closely with the descriptions of this species were taken at Afognak Island. The eyes are much larger than shown in Malmgren's figures and both specimens are filled with eggs. Marenzeller reports this species from Bering Sea.

Stations 4271, Afognak Bay, Afognak Island, 11½-20 fathoms, hard gray sand and rocks; 4272, the same, 12-17 fathoms, sticky mud.

***Phyllodoce mucosa* Oersted.**

Phyllodoce mucosa, Oersted, Ann. Dan. Consp., p. 31.

A single much relaxed specimen of this species, 75 mm. long, including the protruded proboscis, closely resembles the figures and descriptions of this species, but possesses a greater number of setæ than is usually attributed to it.

This example is No. 281, Coll. Acad. Nat. Sci. Phila., collected by Dr. Benjamin Sharp at Icy Cape, Alaska.

Eulalia longicornuta Moore.

Eulalia longicornuta Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 222, 223, Pl. X, figs. 7, 8.

Two specimens found among serpulid tubes taken at the Quarantine Station dock near Port Townsend, Washington, on June 27, 1903. The type is filled with eggs. In both the color has faded to a nearly uniform olive with brown striations on the dorsal cirri.

Eulalia quadrioculata Moore.

Eulalia quadrioculata Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 220, 221, Pl. X, figs. 4-6.

The two specimens, one of them a female filled with large eggs, were taken at Quarantine Rock, Port Townsend, Washington, on June 27, 1903.

Notophyllum imbricatum Moore.

Notophyllum imbricatum Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 217-219, Pl. X, figs. 1-3.

The type comes from Station 4289, Uyak Bay, Kadiak Island, 74-80 fathoms, gray mud; the cotype from Station 4269, Afognak Bay, 14-19 fathoms, hard gray sand and rocks.

POLYNOIDÆ.**Hololepida magna** Moore.

Hololepida magna Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 541-544, Pl. XXV, figs. 24-29.

A single example of this very large and remarkable species was taken at Station 4247 (not 4198 as erroneously recorded in the original description), Kasaan Bay, Prince of Wales Island, southeastern Alaska, 95-114 fathoms, green mud, fine sand and broken shells.

It was taken from the interior of a large vase-shaped sponge, and according to the label the color during life was "creamy white changing to pinkish along dorsal surface." Dr. Heath tells me that on the living worm the elytra were very easily detached and not coherent as after preservation; though of gelatinous consistency they were very brittle.

Halosydna pulchra (Johnson).

Polynoë pulchra Johnson, Proc. Cal. Acad. Sci. (3), I, (1897), p. 177.

Single specimens of this interesting species were taken at several Alaskan localities. A few notopodial setæ usually occur on most of the parapodia. The specimens vary much in color, some being colorless, others with the elytra more or less completely speckled with brown, and one, found living commensally on a holothurian, is recorded on the label as having been poppy red on the dorsal surface, lighter beneath.

The cephalic appendages may possess a filamentous distal part. An incomplete example filled with eggs, and taken at Station 4215, has the median tentacle twice as long as the lateral and is referred doubtfully to this species.

Stations 4219, Admiralty Inlet, vicinity of Port Townsend, Washington, 16 fathoms, soft green mud, from starfish; 4222, same region, 39 fathoms, gray sand and broken shells, from holothurian (*Stichopus californica*); 4223, Boca de Quadra, southeastern Alaska, 48–57 fathoms, soft green mud, young; 4272, Afognak Bay, Afognak Island, 12–17 fathoms, sticky mud, one very beautiful specimen and one smaller and colorless one, both from the ten-armed starfish (*Solaster decemradiata*).

***Halosydna lordi* Baird.**

Halosydna lordi Baird, Journ. Linn. Soc. London, VIII, (1865), p. 190.

A single imperfect specimen without elytra represents this species. In the same bottle is an arm of a starfish (*Luidia columbiæ* Gray), upon which it was presumably commensal. Nanaimo Bay, Vancouver Island, B. C., 12 fathoms, on fish line.

***Halosydna insignis* Baird.**

Halosydna insignis Baird, Journ. Linn. Soc. London, VIII, (1865), p. 188.

Johnson in his paper on the Polychæta of Puget Sound has already noted the occurrence of this species as far north as Kadiak Island. Johnson also describes in the *Proc. Cal. Acad. Sci.* for 1897 some most interesting variations in relation to habitat.

Of the several specimens in this collection scarcely two are alike in color, and they also differ in the extent to which the back is covered by the elytra, the tuberculation of the elytra and the shape of the end of the dorsal cirri—whether abruptly terminating in a short filament or not. None of the specimens is recorded as commensal.

Union Bay, Vancouver Island, B. C.; Port Townsend, Washington, at Quarantine Dock; Stations 4209, Admiralty Inlet, Port Townsend, Washington, 24–25 fathoms, rocks, coarse sand and shells; 4253, Stephens Passage, Alaska, 131–188 fathoms, rocks and broken shells.

***Lepidonotus robustus* Moore.**

Lepidonotus robustus Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 544–546, Pl. XXXVI, figs. 32–35.

The only known specimen of this noteworthy species was taken from the shell of a hermit crab at Station 4291, Shelikof Strait, 48 to 65 fathoms, bottom of blue mud, sand and gravel.

***Lepidonotus oæloris* Moore.**

Lepidonotus caloris Moore, Proc. Acad. Nat. Sci. Phila., 1903, pp. 412-414, Pl. XXIII, fig. 12.

This species, originally described from specimens dredged off the coast of Japan, proves to be one of the most abundant and generally distributed species of Polychæta throughout the region covered by these explorations. It represents in the North Pacific the widely spread *L. squamatus* of the Atlantic, but is quite distinct from that species. The detached submarginal tuft of cilia that is so conspicuous and constant a feature on the elytra of the latter species is quite absent in the former, in which, also, the marginal flask-shaped sense organs are very much fewer and smaller. The outer surface of the elytra is less hairy and bears more numerous and rather smoother papillæ. Much variation is evident in the size, number, arrangement and sculpturing of the papillæ and in the color of the elytra, some specimens being nearly black, others reddish brown, and still others orange or yellow. The neuropodial setæ are quite distinct from those of *L. squamatus*, being more slender, less strongly hooked, more extensively ctenate and in a greater number of rows.

All of these differences are most apparent in the adults, especially when individuals of equal size are compared. The young of *L. caloris* much more closely resemble the Atlantic species, especially in the greater hairiness of the elytra, and it seems not improbable that the small specimens of *L. squamatus* recorded by Johnson from Puget Sound and California and by Marenzeller from Japan may be of this species. It is also not improbable that intermediate forms may be found to connect the two in the Arctic regions, in which case *L. caloris* would become a well-marked subspecies.

Represented in the collections by a greater number of individuals than any other species, *Lepidonotus caloris* was found at many points between Vancouver and Kadiak Islands, at depths ranging from 18 to 313 fathoms and on most kinds of bottom, though naturally most often on mud. It was most abundant on muddy bottoms in the Gulf of Georgia, on a gravelly bottom with sponges at Station 4228, near Naha Bay in the Behm Canal, and on a bottom of rock and broken shells at Station 4253 in Stephens Passage, Alaska.

The stations at which *Lepidonotus caloris* was taken are 4192, 4193, 4197, 4198, 4227, 4228, 4234, 4235, 4239, 4245, 4253, 4258 and 4274.

***Polynoe tuta* Grube.**

Polynoe tuta Grube, Arch. f. Naturges., XXI, 1855, Bd. I, p. 82.

Harmothoe tuta Johnson, Proc. Bos. Soc. Nat. Hist., XXIX (1901), pp. 394, 6.

Of the three examples of this species in the collection, the one from

Fort Rupert agrees exactly with the description given by Johnson; the other two have the cephalic appendages and the dorsal cirri longer and more slender, the eyes farther back, and the neuropodial setæ more slender. All of them exhibit marked asymmetry in the arrangement of the elytra.

Fort Rupert, shore of Union Bay, Vancouver Island, B. C., and Stations 4193, Halibut Bank, Gulf of Georgia, B. C., 18-23 fathoms, green mud and fine sand; 4197, same locality, 31-90 fathoms, sticky green mud and fine sand.

***Polynoe fragilis* (Baird) Johnson.**

Lepidonotus fragilis Baird, Proc. Zool. Soc. Lon., 1863, p. 108.

Polynoe fragilis, Johnson, Proc. Cal. Acad., Vol. I, Zoology, pp. 179-181.

Three complete examples from near Port Townsend alone represent this most interesting commensalistic species. The margins of the elytra are frequently more complexly folded than is indicated by Johnson. Dr. Heath's label states that the color in life is "entire surface of body light yellow, the elytra allowing the color of the body to show through." It is stated that the specimens were taken from *Asterias* sp. The resemblance of these worms to the arms of the starfish is most remarkable and is a subject well worth careful and detailed study by someone on the ground.

Station 4222, Admiralty Inlet, vicinity of Port Townsend, Washington, 39 fathoms, gray sand and broken shells.

***Hermadion truncata* Moore.**

Harmathoe truncata Moore, Proc. Acad. Nat. Sci. Phila., 1902, pp. 272-274, Pl. XIV, figs. 21-28.

This species was originally described from the anterior end of a specimen in the collection of the Academy of Natural Sciences of Philadelphia, at that time supposed to have been collected in Greenland, but now believed to have been taken by Dr. Benjamin Sharp at Icy Cape, Alaska. It is well represented in this collection from the more southern stations. The completeness of some of the examples permits the addition of the following notes to the original description. A length of 80 mm. is attained, the posterior region of the body being slender and tapering. There are 63 segments with 15 pairs of elytra, borne on segments II, IV, V, VII, IX, XI, XIII, XV, XVII, XIX, XXI, XXIII, XXVI, XXIX and XXXII, and leaving the posterior part of the body unprotected except by the bristling setæ. The cephalic peaks are rudimentary, being coalesced with the bases of the lateral tentacles, and the anterior eyes are farther forward than in the type. The style of the median tentacle is slender, about twice the

length of the prostomium and has a scarcely perceptible subterminal enlargement. The lateral tentacles are very short, the short, conical styles with their terminal filaments scarcely exceeding the ceratophores. The extended palpi taper regularly to the end, are slender and 7-8 times the prostomial length. Anterior elytra are circular, the others broadly elliptical, with weak attachment laterad of the center. Their texture is soft and flexible, the surface smooth and punctate and entirely lacking cilia or papillæ of any sort, but with the margin slightly thickened and upturned. The inner half is brown, the outer white in agreement with the color of the body. Dorsal cirri are rather stout with prominent cirrophores and the styles reach beyond the tips of the parapodia. They taper regularly to a subterminal enlargement, beyond which is a short filament. Posterior cirri are longer and more slender and the anal cirri are stouter and very long, equalling the last 9 somites. Usually but one anal cirrus is fully developed. A broad rich brown stripe marks the dorsum, being more or less broken in the middle of the body and spreading over the entire back posteriorly where a median white line sometimes divides it. Dorsal cephalic appendages and dorsal cirri chiefly brown with subterminal and terminal white rings. All other parts, including entire venter, white.

Stations 4193, Halibut Bank, Gulf of Georgia, B. C., 18-23 fathoms, green mud and fine sand; 4197, same region, 31-90 fathoms, sticky green mud and fine sand; 4199, Queen Charlotte Sound, off Fort Rupert, Vancouver Island, B. C., 68-107 fathoms, sticky green mud and volcanic sand; 4208, Admiralty Inlet, vicinity of Port Townsend, Washington, 83-99 fathoms, rocky; 4216, same region, 79-101 fathoms, rocky; 4227, vicinity of Naha Bay, Behm Canal, Alaska, 62-65 fathoms, dark green mud and fine sand.

***Eunoe depressa* Moore.**

Eunoe depressa Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 536-538, Pls. XXXIV, figs. 17, 18; XXXV, figs. 19, 20.

Besides a fragment labelled Union Bay, B. C., 6-22-'03, this species is represented by specimens from Stations 4261 (type), Dundas Bay, Icy Strait, 8½-10 fathoms, green mud and rocks; 4270, Afognak Bay, Afognak Island, Alaska, 14-19 fathoms, hard gray sand and rock. The latter is labelled "Hermit crab, messmate," and many of the papillæ on the elytra bear 2 or 3 spines.

I also refer provisionally to this species under the name of var. *mammillata* a specimen which may represent a distinct but related species. It measures 20 mm. long and has a form similar to but somewhat less broad and depressed than typical *depressa*. The palpi are

barely twice the length of the prostomium, but the other cephalic appendages are longer and much more slender than in the typical form. The median tentacle is about $3\frac{1}{4}$ times and the lateral tentacles nearly $1\frac{1}{2}$ times the length of the prostomium. The cirrophores of the dorsal cirri reach to the end of the notopodia and the slender styles possess long filiform tips which reach to the tips of the longest setæ. The elytra are thinner and more membranous and their shape more ovate-reniform. They also have larger, firmer, and more mammiliform papillæ. But the chief distinction is a strong fringe of cilia along the outer margin of each of the elytra. The general color is reddish brown and the elytra bluish pearl with the larger papillæ orange brown.

The label states that this specimen was taken from the branchial chamber of an 11-pound crab. Station 4276, Alitak Bay, Kadiak Island, Alaska, 22-25 fathoms, fine sand and mud.

Harmothoë imbricata (Linn.) Malmgren.

Harmothoë imbricata, McIntosh, Monograph of British Annelids, Part II, 1900, pp. 314-327.

All of the specimens of this ubiquitous species, which is already well known from the North Pacific, are of small size, the largest being 30 mm. long and most of them much smaller. They present the usual color varieties seen in Atlantic Coast specimens, some being more or less strongly mottled, others having a median light or dark brown band of greater or less breadth. The marginal papillæ on the elytra may be numerous or nearly absent. The two specimens from Kilisut Harbor have the smooth tips of the notopodial setæ longer than usual.

Kilisut Harbor, near Port Townsend, Washington; and Stations 4269, Afognak Bay, Afognak Island, Alaska, $14\frac{1}{2}$ -19 fathoms, hard gray sand and rocks; 4271, same region, $11\frac{1}{2}$ -20 fathoms, hard gray sand and rocks; 4275, Alitak Bay, Kadiak Island, Alaska, 35-36 fathoms, green mud and fine sand; 4289, Uyak Bay, Kadiak Island, 74-80 fathoms, gray mud.

Harmothoë hirsuta Johnson.

Harmothoë hirsuta Johnson, Proc. Cal. Acad. Sci., (3), I (Zoology), pp. 182, 183.

Three examples referred to this species indicate that it is subject to considerable variation. The examination of an extensive series of the *Harmothoës* from this region will be necessary to establish the exact status of these variants.

Stations 4205, Admiralty Inlet, Port Townsend, Alaska, 15-26 fathoms, rocks and shells, a single specimen which agrees with Johnson's description and figures accurately except that the elytra, although

bearing large papillæ, lack distinct marginal areas; 4260, Dundas Bay, Icy Strait, 8½–21 fathoms, coarse sand and rocks, one similar to the last but more distinctly colored; 4259, same region, 21–78 fathoms, gray sand, broken shells and rocks, a small exanple with well-marked marginal areas on the elytra but few large papillæ and with the inter-sections of the ridges between the areas sometimes produced into large, coarse cilia.

Lagisca multisetosa Moore.

Lagisca multisetosa Moore, Proc. Acad. Nat. Sci. Phila., 1902, pp. 267–269, Pl. XIV, figs. 29–36.

This is another species which was originally incorrectly attributed to Greenland, the type locality being almost certainly Icy Cape, Alaska. Like *Hermadion truncata* it is rather plentiful in the collections from the Gulf of Georgia to Behm Canal, being represented, mostly by fragmentary specimens, in the collections from the following:

Stations 4193, Halibut Bank, Gulf of Georgia, B. C., 18–23 fathoms, green mud and fine sand; 4194, same region, 111–170 fathoms, soft green mud; 4197, same region, 31–90 fathoms, sticky green mud and fine sand; 4199, Queen Charlotte Sound, off Fort Rupert, Vancouver Island, B. C., 68–107 fathoms, soft green mud and volcanic sand; 4223, Boca de Quadra, southeastern Alaska, 48–57 fathoms, soft green mud; 4228, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 41–134 fathoms, gravel and sponges.

The species appears to be especially common at the last enumerated station and several fragments taken here depart quite widely from the typical form in the character of the elytra. These are designated as variety *papillata*, characterized as follows: The elytra bear more numerous, larger and differently shaped soft papillæ and very much fewer and smaller hard conical papillæ; and instead of the numerous long cilia on the exposed surface and near the outer margin of the elytra of the typical form, these bear only a few very much shorter cilia with thickened ends.

Lagisca rarisipina (Sars) Malmgren.

Lagisca rarisipina (Sars) Malmgren, Ofvers. Kgl. Vet.-Akad. Förh., 1865, p. 65.

Occurring quite plentifully in the collections from the more northerly points in the Alaskan Gulf, where it apparently largely replaces *L. multisetosa*, this species is represented by two varieties which are, however, connected by intermediates and apparently occur indiscriminately together at the same stations.

The difference is in the presence or absence of the soft marginal

papillæ on the elytra. On some examples these are very numerous, especially on anterior elytra, and have exactly the elongated form and the arrangement exhibited by typical representatives of the species from Greenland and other North Atlantic localities. Others have perfectly smooth elytra, altogether lacking these appendages. Between these two extreme categories, into which most of the specimens fall, are some individuals intermediate in either the number or size of the appendages or in both. Some have the papillæ very short and present on many elytra and others very few papillæ of normal or reduced size. One bears a single papillæ on one elytron and another half a dozen papillæ distributed among three elytra.

Stations 4193, Gulf of Georgia, B. C., 18-23 fathoms, green mud and fine sand; 4198, Halibut Bank, Gulf of Georgia, B. C., 157-230 fathoms, soft green mud; 4219, Admiralty Inlet, Port Townsend, Washington, 16-26 fathoms, green mud, sand, broken shells; 4225, Boca de Quadra, southeastern Alaska, 149-181 fathoms, dark green mud—a single example from each of these stations; 4235, vicinity of Yes Bay, Behm Canal, 130-193 fathoms, gray mud; 4253, Stephens Passage, Alaska, 131-188 fathoms, rocks and broken shells; 4258, vicinity of Funter Bay, Lynn Canal, 300-313 fathoms, mud—plentiful at the last two stations; 4263, Dundas Bay, Icy Strait, 6½-9 fathoms, coarse sand and rocks; 4289, Uyak Bay, Kadiak Island, 74-80 fathoms, gray mud.

***Antinoë macrolepida* Moore.**

Antinoë macrolepida Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 538-541, Pl. XXXV, figs. 21-23.

Antinoë macrolepida is plentiful at the more northerly stations, but occurs as far south as the Gulf of Georgia. It is represented in the collections from the following stations: 4192, off Nanaimo, Vancouver Island, B. C., 89-97 fathoms, green mud and fine sand; 4193, Halibut Bank, Gulf of Georgia, B. C., 18-23 fathoms, green mud and fine sand; 4194, same region, 111-170 fathoms, soft green mud; 4230, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 108-240 fathoms, rocky; 4236, vicinity of Yes Bay, Behm Canal, 147-205 fathoms, rocks and coarse sand; 4237, same region, 194-198 fathoms, green mud; 4264 (type and several other specimens), off Freshwater Bay, Chatham Strait, 282-293 fathoms, green mud; 4299, off Shakan, Sumner Strait, southeastern Alaska, 153-218 fathoms, sand and rocks.

***Gattyana amondseni* (Malmgren).**

Nychia amondseni Malmgren, Annulata Polychæta, etc., 1867, pp. 5 and 6.

Three specimens taken at northern stations agree very closely with Malmgren's description and figures of this species. The neuropodial

setæ are rather more slender and the bifid papillæ on the elytra rather more deeply cleft.

Stations 4253, Stephens Passage, Alaska, 131-188 fathoms, rocks and broken shells; 4272, Afognak Bay, Afognak Island, 12-17 fathoms, sticky mud; 4274, Alitak Bay, Kadiak Island, 35-36 fathoms, green mud and fine sand.

Gattyana ciliata Moore.

Gattyana ciliata Moore, Proc. Acad. Nat. Sci. Phila., 1902, pp. 263-266, Pl. XIII, figs. 14-19.

The type (No. 28, Coll. Acad. Nat. Sci. Phila.) was taken at Icy Cape, and a single example in this collection comes from Station 4289, Uyak Bay, Kadiak Island, 74-80 fathoms, gray mud.

Gattyana cirrosa (Pallas) McIntosh.

Gattyana cirrosa McIntosh, Monograph of British Annelids, Part II, (1900), pp. 285-291.

The only example taken is from Station 4272, Afognak Bay, Afognak Island, 12-17 fathoms, sticky mud.

Gattyana senta Moore.

Gattyana senta Moore, Proc. Acad. Nat. Sci. Phila., 1902, pp. 259-263, Pl. XIII, figs. 1-13.

This species, the type of which came from Icy Cape and is in the collection of the Academy of Natural Sciences, appears to be quite plentiful on the muddy bottoms of the Gulf of Georgia and equally so on a gravelly bottom at Station 4228 in Behm Canal. Most of the examples have lost most of the elytra and are otherwise mutilated, but one specimen permits the description of the posterior elytra which were lacking on the type. They are nearly circular in outline and of smaller size and softer texture than the anterior elytra, but the most striking difference is in the very great length of the terminal branches of the dendritic spines of the posterior margin, the number of forkings of which is, however, less than on anterior scales.

Stations 4191, Gulf of Georgia, off Nanaimo, Vancouver Island, B. C., 54-89 fathoms, fine dark sand, mud and rocks; 4193, Halibut Bank, Gulf of Georgia, 18-23 fathoms, green mud and fine sand; 4197, same locality, 31-90 fathoms, sticky green mud and fine sand; 4198, same locality, 157-230 fathoms, soft green mud; 4228, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 41-134 fathoms, gravel and sponge.

Melænis loveni Malmgren.

Melænis Loveni Malmgren, Ofvers. Kong. Vet.-Akad. Förh., 1865, pp. 78, 79.

Three examples collected by Dr. Benjamin Sharp at Icy Cape, Alaska, are in the collection of the Philadelphia Academy, No. 279.

SIGALEONIDÆ.

Pholoe minuta (Fabricius) Oersted.

Pholoe minuta (Fabricius), McIntosh, Monograph of British Annelids, Part II, (1900), pp. 437-442.

A perfect example nearly an inch in length was taken at Station 4272, at Afognak Bay, Afognak Island, Alaska, in 12-17 fathoms, on a bottom of sticky mud; and a few fragments of a very small individual probably of this species from a bottle containing a *Halosydna insignis* from Port Townsend, Washington.

Peisidice aspera Johnson.

Peisidice aspera Johnson, Proc. Cal. Acad. Sci., (3), (Zool.), Vol. I, pp. 184, 185.

Single examples of this curious little polychæte occur at three rather widely separated stations. The elytra are very stiff and rigid, apparently due to a hard brownish secretion which is deposited in layers, thus giving the appearance of concentric lines of growth. Sand grains adhere to and become imbedded in this substance, especially along the ridge of the scale. This same secretion renders the body brittle, but no sand grains are borne on this region of these specimens. The hairs of the marginal fringes are very unequal, the longest being as much as $\frac{1}{2}$ of the long diameter of the scale. Many of the elytra are marked with dark brown central spots.

Stations 4228, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 41-134 fathoms, gravel and sponge; 4235, vicinity of Yes Bay, 130-193 fathoms, gray mud; 4253, Stephens Passage, 131-188 fathoms, rock and broken shells.

APHRODITIDÆ.

Aphrodita japonica Marenzeller.

Aphrodita japonica Marenzeller, Denks. K. Akad. Wissensch., Wien, XLI, (1879), pp. 111, 112.

From the Gulf of Georgia to the head of Behm Canal this species is common and especially so wherever muddy bottoms occur. These specimens differ in no respect from those taken in the Albatross dredgings off the coast of Japan in 1900. The neuropodial setæ are unusually prominent and slender and when young their tips are incased in a densely hairy sheath, which later wears away, leaving the point smooth. The notopodial setæ are completely imbedded in the felt and are seldom visible. They are slender, soft, curved, pale brown, roughened toward the end and have the tip hooked. Generally the color is very dark—almost black—and the felt is dull, probably the result of staining by some constituent of the mud in which they live. The palpi are white. The specimens vary in length from 14 to 80 mm.

Stations 4194, Halibut Bank, Gulf of Georgia, B. C., 111-170 fathoms, soft green mud; 4197, same region, 31-90 fathoms, sticky green mud and fine sand; 4198, same region, 157-230 fathoms, soft green mud; 4224, Boca de Quadra, southeastern Alaska, 156-166 fathoms, dark green mud; 4225, same region, 149-181 fathoms, dark green mud; 4230, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 108-240 fathoms, rocky; 4231, same region, 82-113 fathoms, green mud and fragments of slate; 4235, vicinity of Yes Bay, Behm Canal, 130-193 fathoms, gray mud; 4236, same region, 147-205 fathoms, rock and coarse sand; 4237, same region, 192-198 fathoms, green mud; 4238, same region, 229-231 fathoms, mud and rocks.

***Aphrodita negligens* Moore.**

Aphrodita negligens Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 526-529, Pl. XXXIV, figs. 1, 2; XXXV, fig. 31.

A single large example 60 mm. long, agreeing exactly with the type, was taken at Station 4205, off Port Townsend, Washington, in 15-26 fathoms, on a bottom of rock and shells. The body cavity is filled with egg-strings.

***Aphrodita parva* Moore.**

Aphrodita parva Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 529-532, Pl. XXXIV, figs. 3-7.

This small and very distinct species is known only from two specimens taken at Station 4194, in the Gulf of Georgia, in 111 to 170 fathoms, on a bottom of soft green mud.

EUPHROSYNIDÆ.

***Euphrosyne bicirrata* Moore.**

Euphrosyne bicirrata Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 532-534, Pl. XXXIV, figs. 8-12.

This species, which belongs to the group including *E. borealis* Oersted and *E. longisetosa* Horst, was taken from the Gulf of Georgia to Behm Canal, in depths ranging from 18 to 188 fathoms. It occurs in the collections from the following stations: 4193 (type), Halibut Bank, Gulf of Georgia, 18-23 fathoms, green mud and fine sand; 4197, same region, 31-90 fathoms, sticky green mud and fine sand; 4228, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 41-134 fathoms, gravel and sponge; 4253, Stephens Passage, Alaska, 131-188 fathoms, rock and broken shells.

***Euphrosyne hortensis* Moore.**

Euphrosyne hortensis Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 534-536, Pl. XXXIV, figs. 13-16.

Much less common than the last, this species was taken at Stations

4272, Afognak Bay, Afognak Island, 12-17 fathoms, sticky mud; and 4274, Alitak Bay, Kadiak Island, 35-41 fathoms, green mud and fine sand. The latter is the type locality.

***Euphrosyne arctica* Johnson.**

Euphrosyne arctica Johnson, Proc. Cal. Acad. Sci., (3), Zoology, Vol. I, p. 159.

A small individual 10 mm. long is believed to represent this species, the original description of which was based upon a probably imperfect and much contracted specimen. There are, however, some points of difference between the two specimens, as the following brief description indicates.

The form is strongly depressed, about equally rounded anteriorly and posteriorly, the somites numbering 21, strongly marked and well developed throughout. The subanal lobes or cirri are large, thick and fleshy. The dorsal smooth field is about $\frac{1}{2}$ the entire width and not subdivided into areas. A black spot or group of spots occurs on the posterior part of each segment behind the second gill.

The caruncle is short and broad, reaching from the anterior margin of II to the posterior margin of IV, and consists entirely of a rather high, thick crest, little free behind. The median tentacle equals the caruncle in length and the stout basal article, which furnishes $\frac{3}{5}$ of its length, nearly equals the caruncle in thickness. The terminal piece is filamentous. The dorsal eyes are very large, elongated and black. The ventral eyes are coalesced and the ventral paired tentacles minute.

The dorsal cirri are very long, much exceeding the length of the caruncle, slender and tapered. The median cirrus arises between the second and third gills and, like the ventral cirrus, is stouter than the dorsal cirrus and equally long. Five pairs of gills occur on the middle region. They are arbusculate and spreading, with some 30 or more slender, lanceolate terminal twigs formed by as many as 5 or 6 irregular dichotomous divisions. The setae agree exactly with Johnson's figures.

Station 4234, vicinity of Yes Bay, Behm Canal, Alaska, 45 fathoms, gray mud and rocks.

ALCIOPIDÆ.

***Callizona angelini* (Kinberg) Apstein.**

Callizona Angelini (Kinberg) Apstein, Die Alciopiden und Tomopteriden der Plankton Expedition, Kiel, 1900, pp. 18, 19.

The addition of this species to the list of Alaskan polychætes becomes possible through the study of the contents of salmon stomachs submitted by Dr. H. M. Smith. The salmon were taken at Yes Bay, Alaska, on July 27 and 28, 1905, and contained a large number of

remains. Many of the worms were already completely disintegrated, but the anterior ends of some were sufficiently intact to remove any reasonable doubt of the correctness of this identification. The only respect in which they differ from the published descriptions is in the presence of as many as 4 stout setæ in the first parapodium (somite IV). A noteworthy characteristic of the species is the considerable length of the cirriform appendage of the parapodia.

Anteriorly the dorsum is a diluted chocolate brown, the surface of the eye cups, the prostomium and a transverse band across each segment being still darker. A brown spot at the base of each dorsal cirrus appears to continue for the entire length of the body. The large numbers in which these worms occur in the salmon stomachs and the evidences that they were filled with sperm and ova indicates that at sexual maturity they must swim in great shoals at the surface.

Originally described by Kinberg from the China Sea, this species has since been twice taken in the Atlantic Ocean, but until now has not been reported from the Pacific.

HESIONIDÆ.

Podarke pugettensis Johnson.

Podarke pugettensis Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, 1901, pp. 397, 398.

This species was taken only in the region of the type locality and probably does not extend much farther northward.

Nanaimo Bay, Vancouver Island, B. C., taken from a starfish (*Tuidia*) brought up on a fish line; Quarantine Rock, near Port Townsend, Washington; Station 4218, Admiralty Inlet, near Port Townsend, Washington, 16 fathoms, soft green mud, on starfish (*Tuidia*).

NEPHTHYDIDÆ.

Nephtys cœca (Fabricius) Oersted.

Nephtys cœca, Ehlers, Die Borstenwürmer, 1868, pp. 588-617.

The presence of this circumpolar species throughout a great extent of both sides of the North Pacific is already well known. Typical examples occur in the collections from the following stations: 4230, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 108-240 fathoms, rocky; 4236, vicinity of Yes Bay, Behm Canal, 147-205 fathoms, rocks and coarse sand; 4240, junction of Clarence Strait and Behm Canal, 248-256 fathoms, coral.

Nephtys ciliata (Müller) Rathke.

Nephtys ciliata, Malmgren, Ofvers. Kgl. Vet.-Akad. Förh., 1865, p. 104.

Whether or not Wiren was correct in considering this and the pre-

ceding to be variants of the same species, the considerable amount of material which I have examined exhibits no evidence of intergradation and the two forms are therefore listed separately. It is noteworthy that they were taken on bottoms of quite different character.

Stations 4194, Halibut Bank, Gulf of Georgia, 111-170 fathoms, soft green mud; 4197, same region, 31-90 fathoms, sticky green mud and fine sand; 4244, Kasaan Bay, Prince of Wales Island, southeastern Alaska, 50-54 fathoms, green mud; 4258, vicinity of Funter Bay, Lynn Canal, 300-313 fathoms, mud; 4286, Chinak Bay, Alaska, 57-63 fathoms, green mud and rock.

***Nephtys malmgreni* Theel.**

Nephtys longisetosa Malmgren, Kgl. Vet.-Akad. Förh., 1865, p. 106; non Oersted.

Nephtys malmgreni Theel, Kgl. Sv. Vet. Akad. Handl., 1879, No. 3, p. 26.

Although recorded at various points in the North Atlantic and Arctic Oceans this species has not previously been taken in the Pacific. It occurs in the collections from the vicinity of Yes Bay, Behm Canal, only, at Stations 4236, 147-205 fathoms, rock and coarse sand, and 4238, 229-231 fathoms, rocks and mud.

***Nephtys assimilis* Malmgren.**

Nephtys assimilis Malmgren, Kgl. Vet.-Akad. Förh., 1865, p. 105.

No representatives of *N. assimilis* occur among the material dredged by the Albatross, but the collection of the Academy of Natural Sciences of Philadelphia contains several examples which agree exactly with the descriptions given by Malmgren and Theel, and which were collected by Dr. Benjamin Sharp in 5 fathoms at Icy Cape, Alaska.

NEREIDÆ.

***Nereis pelagica* Linnaeus.**

Nereis pelagica Linnaeus, Sys. Nat., Ed. X, p. 654.

Although quite common and represented from nearly the entire region covered by these collections, the individuals are of smaller size than occur on the Atlantic side of the continent.

Stations 4193, Halibut Bank, Gulf of Georgia, B. C., 18-23 fathoms, green mud and fine sand; 4209, Admiralty Inlet, vicinity of Port Townsend, Washington; 4247, Kasaan Bay, Prince of Wales Island, southeastern Alaska, 89-114 fathoms, green mud, fine sand and broken shells; 4253, Stephens Passage, Alaska, 131-188 fathoms, rocks and broken shells; 4274, Alitak Bay, Kodiak Island, 35-41 fathoms, green mud and fine sand. At Port McArthur, on August 23, two small heteronereids were taken at the surface. Also collection of Acad. Nat. Sci. Phila., several collected at Unalaska by Dr. Sharp.

Nereis procera Ehlers.

Nereis procera Ehlers, Die Borstenwürmer, 1868, p. 557.

This little known species is represented by a single incomplete specimen taken at the type locality in the Gulf of Georgia. Station 4193, Halibut Bank, Gulf of Georgia, 18-23 fathoms, green mud and fine sand.

Nereis paucidentata Moore.

Nereis paucidentata Moore, Proc. Acad. Nat. Sci. Phila., 1903, pp. 430, 431, Pl. XXIV, figs. 28-30.

Originally described from specimens dredged in Bering Sea, the present collections show that this species is rather widely distributed along the northern portions of the east side of the Pacific also. At the same time they permit of the verification of the characters originally attributed to the species. Several specimens with the probosces protruded exhibit paragnaths exactly like those of the type, except that groups III and IV vary somewhat, being provided with 3 to 5 denticles arranged in various patterns. One had 5 teeth arranged in a perfect quincunx. The basal ring of one specimen bears 4 cones at VII.

Stations 4198, Halibut Bank, Gulf of Georgia, B. C., 157-230 fathoms, soft green mud; 4228, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 41-134 fathoms, gravel and sponge; 4239, junction of Clarence Strait and Behm Canal, 206-248 fathoms, coarse sand and rocks, one specimen from this station is a large female bursting with eggs, 80 mm. long and having 120 segments; 4253, Stephens Passage, Alaska, 131-188 fathoms, rocks and broken shells; 4300, off Shakan, Sumner Strait, southeastern Alaska, 185-218 fathoms, rock and mud.

Nereis cyclurus Harrington.

Nereis cyclurus Harrington, Trans. N. Y. Acad. Sci., XVI, 1897, p. 214.

This remarkable and interesting species should probably be separated generically from the above. In only one case is it stated that the specimens were taken from a hermit crab (*E. upagurus armatus*), in the shell of which this annelid usually lives as a commensal. The finding of a male heteronereis is of interest, especially as it was taken on the shell of a hermit crab. After an elaborate study of this species Harrington records his failure to find a male, and states his belief that males are strictly pelagic in habit.

Stations 4201, Queen Charlotte Sound, off Fort Rupert, Vancouver Island, B. C., 138-145 fathoms, soft green mud, sand and broken shells, a small specimen, "general color bright pink, in delicate tube composed of mucus attached to sponge"; 4218, Admiralty Inlet, vicinity of Port Townsend, Washington, 16 fathoms, soft green mud, 1 ordinary form

and 1 heteronereis (male) from shell of hermit crab; 4220, same region 16-31 fathoms, green mud, sand and broken shells.

Nereis (Alitta) vexillosa Grube.

Nereis vexillosa Grube in Middendorff, Reise in Siberiens, etc., II, 1851, p. 4.
Nereis vexillosa, Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, p. 399.

On the Pacific this species represents the *Nereis limbata*, so abundant along much of the Atlantic coast of North America. It, however, reaches a larger size. As but little shore collecting was done it is not represented in the collection from many points.

Taylor Bay, Gabriola Island, Gulf of Georgia; Quarantine Rock, Port Townsend, and the beach near Shakan, Sumner Strait, southeastern Alaska; collection Acad. Nat. Sci. Phila., Admiralty Inlet, Puget Sound, Washington, by George Dawson.

Nereis (Alitta) virens Sars.

Nereis virens, Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, p. 398.

I have not given very close attention to the specific likeness or distinction of the Atlantic *N. virens* and the Pacific *N. brandti*, but so far as comparisons have been made they appear to confirm Johnson's view that the two are identical. Being chiefly a shore lover like the last it is not well represented in this collection.

Taylor Bay, Gabriola Island, B. C., 11 specimens varying from 9 to 18 inches long. Many are in regeneration posteriorly and the number of segments appear to exceed the average attained by Atlantic specimens. Union Bay, Alaska, a splendid example unfortunately incomplete, but which in life must have exceeded 2 feet in length. The tentacular cirri are very short and thick. Also one in the Academy of Natural Sciences, collected by George Dawson at Admiralty Inlet, Washington.

Platynereis agassizi (Ehlers).

Nereis agassizi Ehlers, Die Borstenwürmer, 1868, p. 542.

It seems probable that the Japanese specimens referred to *N. dumerilii* by Marenzeller belong to this closely related but perfectly distinct species. A small heteronereid resembling that of the Atlantic *P. megalops* was taken at Quarantine Rock, near Port Townsend, on June 27.

Kilisut Harbor and Quarantine Rock, near Port Townsend, Washington. Stations 4219, Admiralty Inlet, near Port Townsend, Washington, 16-26 fathoms, green mud, sand and broken shells; 4223, Boca de Quadra, southeastern Alaska, 48-57 fathoms, soft green mud.

EUNICIDÆ.

Eunice kobiensis McIntosh.

Eunice kobiensis McIntosh, Challenger Reports, Zool., Vol. XII, pp. 278-280.

Several specimens of *Eunice* exhibiting considerable variation *inter se*, but presenting a mean very close to this species originally taken off the coast of Japan, were collected in Alaskan waters. The largest individual is 90 mm. long and 5 mm. wide, being therefore larger than those described by McIntosh. The maximum number of branchial pinnæ exhibited by different specimens varies from 5 to 8 according to the size, and the gills begin on V or VI and end at from XLV to LVIII. The characters of the setæ and acicula are very constant and differ in no respect from those assigned to *Eunice kobiensis*. On the other hand the jaws vary considerably and the large paired plates may exhibit a number of teeth either greater or less than is shown in McIntosh's figure. The cephalic appendages generally average shorter and the peristomium longer than on the Japanese specimens, and the ventral cirri are larger than is usual in this genus.

Stations 4235, vicinity of Yes Bay, Behm Canal, southeastern Alaska, 130-193 fathoms, gray mud; 4253, Stephens Passage, Alaska, 131-188 fathoms, rock and broken shells; 4272, Afognak Bay, Afognak Island, 12-17 fathoms, sticky mud; 4274, Alitak Bay, Kadiak Island, 35-41 fathoms, green mud and fine sand; 4289, Uyak Bay, Kadiak Island, 74-80 fathoms, gray mud. The last recorded specimen is stated to have come from a "tube 11 inches long, formed of small stones and attached to a slab of slate."

ONUPHIDÆ.

Nothria iridescens Johnson.

Nothria iridescens Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, p. 408.

This species was originally described by Johnson from a single specimen lacking the caudal end which was dredged by Prof. Herdman at Victoria, B. C. It proves to be abundant on muddy bottoms in the Gulf of Georgia and much less common northward to Prince of Wales Island, southeastern Alaska. The presence of a posterior end permits the completion of Johnson's description. After gradual reduction in length the branchiæ are totally wanting from the last 30 sonites. The pygidium is provided with a thickened circumanal welt, from the ventral side of which arise 4 cirri in a close tuft. The 2 median are about $\frac{1}{3}$ longer than the lateral pair and correspondingly stouter. Besides hooded crochets (of which Johnson's figure shows one foreshortened) and capillary setæ, posterior segments contain a

tuft of the usual expanded pectinate setæ. All three kinds continue to the last setigerous segment.

A large number of tubes differ from the one described by Johnson. They are 5 to 6 inches long and about 4 mm. in diameter, composed of a tough, membranous, mucoid lining covered with a thick coating of silt, often arranged in two distinct layers of quite different composition.

Stations 4192, Gulf of Georgia, off Nanaimo, Vancouver Island, B. C., 89-97 fathoms, green mud and fine sand; 4193, Halibut Bank, Gulf of Georgia, 18-23 fathoms, green mud and fine sand; 4194, same region, 111-170 fathoms, soft green mud, a great many tubes; 4197, same region, 31-90 fathoms, sticky green mud and fine sand; 4198, same region, 157-230 fathoms, soft green mud; 4223, Boca de Quadra, southeastern Alaska, 48-57 fathoms, soft green mud; 4244, Kasaan Bay, Prince of Wales Island, 50-54 fathoms, green mud; 426, same region, 101-123 fathoms, gray-green mud, coarse sand and shells.

Nothria geophiliformis Moore.

Nothria geophiliformis Moore, Proc. Acad. Nat. Sci. Phila., 1903, pp. 445-448.

A single example from Station 4244, Kasaan Bay, Prince of Wales Island, 50-54 fathoms, green mud.

LUMBRINERIDÆ.

Lumbrineris heteropoda Marenzeller.

Lumbriconereis heteropoda Marenzeller, Denks. Kaiserl. Akad. Wissensch. Wien, 1879, Abth. 2, pp. 138, 139.

A species of *Lumbrineris* widely and generally distributed over the field covered by these explorations is assigned with much hesitation as above. The variability of the jaws and the form of the prostomium in species of this genus, taken with the fact that the exact region from which the parapodia described or figured for many species have been selected is often not indicated, renders identification of representatives of this genus very difficult. The smaller examples resemble *L. heteropoda* in every respect, but the larger ones have the prostomium shorter and more broadly rounded; the jaws vary in respect to the form and number of teeth on the individual plates and probably in a greater divergence of the lobes of the posterior parapodia. The presence of a tuft of very long slender winged setæ in the lower part of the supra-acicular tuft of the middle parapodia of some specimens is also a noteworthy character which may indicate specific separation from *L. heteropoda*. One fine example from Station 4251 is 380 mm. long, 7 mm. wide, and has 355 segments. It is filled with nearly mature eggs.

Stations 4201, Queen Charlotte Sound, off Fort Rupert, Vancouver Island, B. C., 138-145 fathoms, soft green mud, sand and broken shells, 4227, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 62-65 fathoms, dark green mud and fine sand; 4235, vicinity of Yes Bay, Behm Canal, 130-193 fathoms, gray mud; 4236, same region, 147-205 fathoms, rocks and coarse sand; 4237, same region, 192-198 fathoms, green mud; 4240, junction of Clarence Strait and Behm Canal, 248-256 fathoms, coral; 4241, same region, 245-238 fathoms, green mud; 4251, Stephens' Passage, Alaska, 198 fathoms, rocky; 4252, same region, 198-201 fathoms, gray mud; 4274, Alitak Bay, Kadiak Island, 35-41 fathoms, green mud and fine sand. Also a doubtful specimen in the Academy of Natural Sciences, collected by Dr. Benjamin Sharp at Icy Cape, Alaska.

***Ninoë simpla* Moore.**

Ninoë simpla Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 547-549, Pl. XXXV, fig. 30; XXXVI, figs. 39-44.

This very distinct species resembles *N. nigripes* Vorrill in general appearance, but differs widely from that and other species in having the gills simple instead of palmate and in the presence of a small median tubercle on the prostomium.

It was taken at Stations 4235, 4236 and 4238, in the vicinity of Yes Bay, Behm Canal, Alaska, in 130-231 fathoms, on muddy bottoms.

STAURONEREIDÆ.

***Stauronereis annulatus* Moore.**

Stauronereis annulatus Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 225-227, Pl. X, figs. 12, 13; XI, figs. 18-22.

Taken only at Quarantine Rock, Port Townsend, Washington, June 27, 1903.

GLYCERIDÆ.

***Glycera nana* Johnson.**

Glycera nana Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, p. 411.

Although most of the specimens of this species were taken not far from the type locality in Puget Sound, two were found on the Alaskan beaches.

Stations 4193, Halibut Bank, Gulf of Georgia, B. C., 18-23 fathoms, green mud and fine sand; 4197, same region, 31-90 fathoms, sticky green mud and fine sand; 4223, Boca de Quadra, southeastern Alaska, 48-57 fathoms, soft green mud; also beach at Port Ellis and near Shakan, Sumner Strait, southeastern Alaska.

***Glycera tessellata* Grube.**

Glycera tessellata Grube, Arch. f. Naturges., 1863, I, p. 41.

Two small and one large specimens (the latter a fragment measuring 5 mm. across) of this genus are believed to belong to this species, which has not hitherto been recorded at attaining so great a size.

Station 4197, Halibut Bank, Gulf of Georgia, B. C., 31-90 fathoms, sticky green mud and fine sand.

GONIADIDÆ.***Glycinde wireni* Arwidsson.**

Glycinde wireni Arwidsson, Bergens Museums Aarbog, 1899, No. 11, pp. 53, 54.

This species, taken during the voyage of the Vega at various points in the Arctic Ocean and Bering Sea, ranges as far south as the Gulf of Georgia.

Stations 4192, Gulf of Georgia, off Nanaimo, Vancouver Island, B. C., 89-97 fathoms, green mud and fine sand; 4194, Gulf of Georgia, Halibut Bank, 111-170 fathoms, sticky green mud; 4197, same region, 31-90 fathoms, sticky green mud and fine sand; 4223, Boca de Quadra, southeastern Alaska, 48-57 fathoms, soft green mud; 4231, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 82-113 fathoms, green mud and slate fragments; 4235, vicinity of Yes Bay, Behm Canal, 130-193 fathoms, gray mud. The last specimen is a ripe male, distended with sperm.

***Goniada annulata* Moore.**

Goniada annulata Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 549-553, Pl. XXXVI, figs. 45-48.

Most of the specimens are mature and have the posterior region distended with eggs or sperm. There is a distinct tendency to increase in size in correspondence with the location of the station from south northward. The species is quite common from Halibut Bank, in the Gulf of Georgia, northward to Chatham Strait. Stations 4197, Halibut Bank, Gulf of Georgia, B. C., 31-90 fathoms, sticky green mud and fine sand; 4198, same region, 157-230 fathoms, soft green mud; 4235, vicinity of Yes Bay, Behm Canal, 130-193 fathoms, gray mud; 4237, same region, 192-198 fathoms, green mud; 4238, same region, 229-231 fathoms, mud and rocks; 4258, vicinity of Funter Bay, Lynn Canal, 300-313 fathoms, mud; 4264, off Freshwater Bay, Chatham Strait, 282-293 fathoms, green mud.

AMPHARETIDÆ.***Ampharete arctica* Malmgren.**

Ampharete arctica Malmgren, Kgl. Vet.-Akad. Förh., 1865, p. 364.

Wiren has already recorded this species from Bering Sea. Other-

wise it is unknown from the Pacific region. Except that their paleoli have more produced points than Malmgren figures, these specimens agree exactly with his account. A portion of a tube is 6.5 mm. in diameter, with a lumen of 4 mm. and very fragile walls of fine silt.

Stations 4225, Boca de Quadra, southeastern Alaska, 149-181 fathoms, dark green mud; 4258, vicinity of Funter Bay, Lynn Canal, 300-313 fathoms, mud.

***Amphiteis alaskensis* Moore.**

Amphiteis alaskensis Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 846-849, Pl. XLIV, figs. 1-4.

Taken at Stations 4274, Alitak Bay, at a depth of 35-41 fathoms on a bottom of green mud with some fine sand, and 4223, Boca de Quadra, southeastern Alaska, 48-57 fathoms, soft green mud.

***Amphiteis glabra* Moore.**

Amphiteis glabra Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 849-851, Pl. XLIV, figs. 5-8.

A small portion of a tube is peculiarly elastic and springy and is covered with a layer of brownish flocculent sediment.

Station 4227, Behm Canal, in the vicinity of Naha Bay, 62 fathoms, bottom of dark green mud and fine sand.

***Amphiteis scaphobranchiata* Moore.**

Amphiteis scaphobranchiata Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 255-257, Pl. XII, figs. 54-61.

Taken at the type locality only, Station 4201, off Fort Rupert, Vancouver, in Queen Charlotte Sound, 138-145 fathoms, soft green mud, sand and broken shells.

***Melinna denticulata* Moore.**

Melinna denticulata Moore, Proc. Acad. Nat. Sci. Phila., 1905, p. 859, Pl. XLIV, figs. 9 and 10.

Melinna cristata Moore, *id.*, pp. 851-853.

The original description of this species was inadvertently placed under the name of *M. cristata*, which, as is well known, has already been employed by Sars. The name *denticulata* was, however, correctly used in the description of the figures on page 857.

The type and only specimen was taken at Station 4258, in the vicinity of Funter Bay, Lynn Canal, on a bottom of mud, 300-313 fathoms.

***Melinna cristata* (Sars) Malmgren.**

Melinna cristata Malmgren, Ofvers. Kgl.-Vet. Akad. Förh., 1865, p. 371.

Two well-preserved specimens in their thick-walled mud tubes represent this species. They were both dredged at Boca de Quadra,

southeastern Alaska, at Stations 4224 and 4225, 149-188 fathoms. dark green mud.

***Samytha bioculata* Moore.**

Samytha bioculata Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 253-255, Pl. XLIV, figs. 11-13.

The upper, thickened portion of the mud tube is strengthened by large numbers of siliceous sponge spicules.

Two specimens were taken at Station 4197, Gulf of Georgia, 31-90 fathoms, sticky green mud and fine sand.

TEREBELLIDÆ.

***Amphitrite robusta* Johnson.**

Amphitrite robusta Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, pp. 425, 426.

This species appears to be quite abundant in the Gulf of Georgia and as far north as Naha Bay, Behm Canal. It reaches a larger size than is indicated by Johnson, sometimes exceeding 140 mm. in length and 18 mm. in diameter, the greatest number of segments being 83. The divisions of the branchiæ are often longer than figured by Johnson, whose figure of the uncinus also is somewhat foreshortened. The number of setigerous somites is constantly 17, as stated by Johnson. Some of the specimens bear short cirri or papillæ beneath the setæ of some of the anterior segments. This is probably a secondary sex character, but this could not be ascertained with certainty.

Stations 4193, Halibut Bank, Gulf of Georgia, B. C., 18-23 fathoms, green mud and fine sand; 4194, same region, 111-170 fathoms, soft green mud; 4197, same region, 31-90 fathoms, sticky green mud and fine sand; 4198, 157-280 fathoms, soft green mud; 4228, vicinity of Naha Bay Behm Canal, 41-134 fathoms, gravel and sponge.

***Amphitrite radiata* nom. nov.**

Amphitrite palmata Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 858, 859, Pl. XLIV, figs. 19-22; not *A. palmata* Malmgren, 1865.

Stations 4227, Naha Bay, Behm Canal, 62-65 fathoms, dark green mud and fine sand; 4245 (type locality), Kasaan Bay, Prince of Wales Island, 95-98 fathoms, dark green mud with fragments of shell, rock and sand; 4253, Stephens Passage, 131-188 fathoms, rock and broken shells.

***Lanice heterobranchia* Johnson.**

Lanice heterobranchia Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, p. 427.

The original description is based upon a single specimen which was stated to have no eyes. All of several specimens in the present collection possess very numerous deep brown eyes arranged in a compact

narrow band on each side, with a dorsal interval equal to the interbranchial space and a longer ventral interval. These eyes are ordinarily concealed by the inrolled margin of the prostomial fold. The inequality of the gills seems to be a constant character and the number of setigerous segments is 17, as stated by Johnson. Part of a tube is covered with small pebbles, sea-urchin spines, bits of eel grass, etc.

None of the specimens was found near the type locality in Puget Sound, but all in Alaskan waters at the following stations: 4228, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 41-134 fathoms, gravel and sponge; 4259, Dundas Bay, Icy Strait, 21-78 fathoms, gray sand, broken shell and rock; 4283 Chignik Bay, 30-41 fathoms, black sand and brown sponge; 4289, Uyak Bay, Kadiak Island, 74-80 fathoms, gray mud.

Pista cristata (Müller) Malmgren.

Pista cristata Malmgren, Ofvers. Kongl. Vet.-Akad. Förh., 1865, pp. 382, 383.

The single example of *Pista* referred to this species agrees with those dredged by the Albatross off the coast of Japan, and differs from *P. cristata* as described by European authors in having the upper free angle of the lateral subbranchial membrane of IV much more produced and prominent, quite equalling that of III. Otherwise they agree, so far as can be ascertained, in all features. The handles of the uncini on V are longer than the others, but there is no other difference.

Station 4225, Boca de Quadra, southeastern Alaska, 149-181 fathoms, dark green mud.

?***Pista fasciata*** (Grube) Marenzeller.

Pista fasciata Marenzeller, Denks. Kais. Akad. Wissensch., 1885, Abth. 2, pp. 202-204.

Concerning the reference of the fine species of *Pista* found at several stations in southeastern Alaska to the above named, I am in much doubt. Grube's description of *Terebella fasciata* is not sufficiently precise for certain determination, but the excellent accounts and figures given by Marenzeller and McIntosh seem to me to refer to different species. In any event the figure of the branchiæ given by the latter would not answer for these specimens, as the terminal twigs are much more spreading and uneven. About 3 or 4 main branches spring from the trunk, and these immediately branch and rebranch asymmetrically 8 or 10 times, the main stem being always recognizable, but bending at each point of branching and tapering continuously to the end. Usually 3 gills are well developed, and 1 is either very small and entirely without branches or may be altogether wanting. Which are well developed appears to be quite accidental. They may

be the two of a pair, or the two of one side, or the left of one and right of the other pair.

All of the specimens exhibit the great flaring wings so well shown in McIntosh's figure, and there is a distinct postbranchial fold across the dorsum of IV. The cirri above and behind the setæ bundles of VI and VII are well developed. In respect to most of their characters the uncini resemble McIntosh's figure closer than those given by Marenzeller, but the former fails to show the guard.

Although none of the specimens is complete, upwards of 100 segments are present, and even incomplete examples measure 160 mm. long and 6 mm. wide across the thorax, being therefore much larger than Marenzeller's specimen. The tube has a thick wall composed of fine silt. The one from Station 4246 is filled with eggs.

Stations 4225, Boca de Quadra, southeastern Alaska, 149-181 fathoms, dark green mud; 4229, vicinity of Naha Bay, Behm Canal, 198-256 fathoms, soft gray mud; 4230, same region, 108-240 fathoms, rocky; 4237, vicinity of Yes Bay, Behm Canal, 192-198 fathoms, green mud; 4246, Kasaan Bay, Prince of Wales Island, 101-123 fathoms, gray-green mud, coarse sand and shells.

***Læna nuda* Moore.**

Læna nuda Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 855, 856, Pl. XLIV, figs. 14, 15.

Known only from the type specimen, a female filled with eggs and preserved in a soft mucous tube coated with a thin layer of foreign materials. It was taken at Station 4279, Kadiak Island, 29 fathoms, dark gray mud.

***Thelepus hamatus* Moore.**

Thelepus hamatus Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 856-858, Pl. XLIV, figs. 16-18.

The type comes from Station 4235, Yes Bay, Behm Canal, 130-193 fathoms, green mud, and a second poorly preserved specimen from Station 4227, Naha Bay, Behm Canal, 62-65 fathoms, dark green mud and fine sand.

***Atacama conifera* Moore.**

Atacama conifera Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 853-855, Pl. XLIV, figs. 11-13.

Type from Station 4194, Gulf of Georgia, 111-170 fathoms, bottom of soft green mud. A second specimen comes from an unknown station.

***Terebellides stræmi* Sars.**

Terebellides stræmii Sars, Beskrivelser og lagthagelser, etc., 1835, p. 48.

The proper discrimination of the species of *Terebellides* is still a

desideratum. While in their more obvious characters the species are very constant, in respect to others they vary greatly. The representatives of the genus found in this collection are in most respects indistinguishable from the widely distributed *T. stramii* as described by European writers. On the other hand the transitional setæ of somite VIII and the abdominal uncini present slight but quite obvious differences at nearly every station. It seems probable that this species as usually recognized includes a large number of subspecies.

The bent setæ of VIII vary in the length and shape of the bent limb. The uncini usually have 5 teeth in the series above and surrounding the beak; surmounting these is a second row of 3 smaller teeth, and crowning all a single still smaller median tooth. The latter varies in size and in distinctness from the median tooth of the row below, with which it is more or less coalesced; it may even be wanting entirely. The most distinct form occurs on a large example from Station 4247, in which all of the abdominal uncini examined have the median teeth of the second and third rows completely coalesced and that of the first row altogether absent, leaving a gap. The result is that the beak and one nearly equally large tooth occupy the middle line and a large tooth flanked by a smaller one lies on each side of the gap. Most of the specimens are filled with eggs or sperm.

Stations 4223, Boca de Quadra, southeastern Alaska, 48-57 fathoms, soft green mud; 4244, Kasaan Bay, Prince of Wales Island, 50-54 fathoms, green mud; 4247, same region, 89-114 fathoms, green mud, fine sand, broken shells; 4281, Chignik Bay, 42-43 fathoms, green mud.

Polycirrus sp.

An undetermined species of *Polycirrus* was taken at Kilisnoe Harbor.

AMPHICTENIDÆ.

Pectinaria auricoma (Müller).

Amphictene auricoma Malmgren, Ofvers. Kongl. Vet.-Akad. Förh., 1866, pp. 357, 358.

All of the Amphictenidæ in the collection belong to one species which is clearly distinct from any of those hitherto recorded in the Pacific. While closely resembling *P. auricoma* in nearly every respect, there are some points of distinction between these and European examples which may require their eventual specific or subspecific separation. The margin of the cephalic membrane is more obscurely and much more irregularly dentate; the uncini usually have 5 large teeth, and the series of fine teeth on the inferior process is not continued on to the upper part of the process beneath the lower large tooth; the scapha

hooks are never as completely circular at the end as figured for European specimens. The paleoli are always 12. In the smaller specimens they have rather long slender tips which wear away, leaving the ends blunt or, in the case of the lateral ones, somewhat pointed.

Stations 4192, Gulf of Georgia, off Nanaimo, Vancouver, B. C., 89-97 fathoms, green mud and fine sand; 4235, vicinity of Yes Bay, Behm Canal, southeastern Alaska, 130-193 fathoms, gray mud; 4244, Kasaan Bay, Prince of Wales Island, 50-54 fathoms, green mud; 4286, Chignik Bay, 57-63 fathoms, green mud and rocks.

CAPITELLIDÆ.

Notomastus giganteus Moore.

Notomastus giganteus Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 227, 228, Pl. X, figs. 24, 25.

The type locality is Station 4264, off Freshwater Bay, in Chatham Strait, 282-293 fathoms, green mud; a larger but incomplete cotype was taken at Station 4197, Gulf of Georgia, 31-90 fathoms, sticky green mud and fine sand.

OPHELIIDÆ.

Ammotrypane aulogaster Rathke.

Ammotrypane aulogaster Rathke, Nov. Act. Acad. Cæs. Leop.-Car. Nat. Cur., (1843), XX, pp. 188-190.

A single individual 27 mm. long and consisting of 49 segments was taken at Station 4235, vicinity of Yes Bay, Behm Canal, 130-193 fathoms, gray mud.

Ammotrypane brevis Moore.

Ammotrypane brevis Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 354, 355, text fig.

The single example on which this species is based is distinguished from the preceding by having the prostomium somewhat depressed dorso-ventrally instead of compressed laterally, by the small number (29) of setigerous somites, and by having the large spoon-shaped anal lobe represented by a slender process only. The type, a female filled with eggs, is No. 284 of the collection of the Academy of Natural Sciences of Philadelphia, and was collected by Dr. Benjamin Sharp at Icy Cape, Alaska.

Travisia forbesii Johnston.

Travisia forbesii Johnston, Ann. Nat. Hist., IV, (1840), p. 373.

Already recorded from Bering Sea by both Wiren and Marenzeller, this species would be expected to occur on the coast of Alaska. While none were taken by the Albatross naturalists, there are six specimens in

the collection of the Academy of Natural Sciences, taken by Dr. Sharp at Icy Cape. They vary from 25 to 40 mm. in length and one has the posterior end regenerating. This species is easily distinguished from the next by having smooth setæ, whereas in *T. pupa* they are hispid and also somewhat stouter.

***Travisia pupa* Moore.**

Travisia pupa Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 228-231, Pl. XI, fig. 23.

This is an abundant worm, conspicuous from its large size and wide-spread on muddy bottoms. Specimens were taken at the following stations: 4192, Gulf of Georgia, 18-23 fathoms, green mud and fine sand; 4194, Gulf of Georgia (type locality), 111-170 fathoms, soft green mud; 4197, Gulf of Georgia, 31-90 fathoms, sticky green mud and fine sand; 4230, Behm Canal, 108-240 fathoms, rocky; 4235, Behm Canal, 130-193 fathoms, gray mud; 4237, Behm Canal, 192 fathoms, green mud; 4246 Kasaan Bay, Prince of Wales Island, 101-123 fathoms, gray and green mud, coarse sand and shells.

MALDANIDÆ.

***Maldane sarsi* Malmgren.**

Maldane Sarsi Malmgren, Öfvers. Kgl. Vet.-Akad. Förh., 1865, p. 188.

McIntosh and the writer have already recorded this species as occurring in the Pacific off Japan and Wiren in Bering Sea. The posterior capillary setæ have the hairs arranged not in opposite pairs, but spirally.

Stations 4224, Boca de Quadra, southeastern Alaska, 156-166 fathoms, dark green mud; 4264, off Freshwater Bay, Chatham Strait, 282-293 fathoms, green mud; 4286, Chignik Bay, 57-63 fathoms, green mud and rocks. The specimen last listed is a piece of the posterior end, including the pygidium, of a very large individual 3 mm. in diameter.

***Maldane similis* Moore.**

Maldane similis Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 233-236, Pl. XI, figs. 26-30.

The type and one other specimen were taken at Station 4264, off Freshwater Bay, Chatham Strait, 282-293 fathoms, green mud.

***Maldanella robusta* Moore.**

Maldanella robusta Moore, Proc. Acad. Nat. Sci. Phila., 1906, 236-239, Pl. XI, figs. 31, 32.

Specimens of *M. robusta* were taken at Stations 4197, Gulf of Georgia, 31-90 fathoms, sticky green mud and fine sand; 4230, Behm Canal, 108-240 fathoms, rocky bottom; and 4246 (type locality), 101-123 fathoms, green mud with coarse sand and shell fragments.

Lumbriolymene pacifica Moore.

Lumbriolymene pacifica Moore, Proc. Acad. Nat. Sci. Phila., pp. 246-248, Pl. XII, figs. 40-42.

Two complete worms and a fragment, together with four or five tubes, were taken at Station 4264, off Freshwater Bay, Chatham Strait, 282-293 fathoms, green mud; and a caudal end at Station 4199, Queen Charlotte Sound, off Fort Rupert, Vancouver, B. C., 68-107 fathoms, soft green mud and volcanic sand.

Clymenella tentaculata Moore.

Clymenella tentaculata Moore, Proc. Acad. Nat. Sci. Phila., pp. 239-242, Pl. XI, figs. 33-35.

Known only from two fragments taken at Station 4264, off Freshwater Bay, Chatham Strait, July 25, 282-293 fathoms, green mud.

Nicomache carinata Moore.

Nicomache carinata Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 242-246, Pls. XI, figs. 36-39; XII, figs. 43, 44.

Fragments of this species occur in the collections from the Gulf of Georgia, Station 4197, 31-100 fathoms, sticky green mud and fine sand; and Station 4198, 157-230 fathoms, soft green mud. The type locality is Station 4227, in the vicinity of Naha Bay, Behm Canal, 62-65 fathoms, dark green mud and fine sand.

SCALIBREGMIDÆ.**Scalibregma inflatum** Rathke.

Scalibregma inflatum Rathke, Nov. Act. Acad. Cæs. Leop.-Car. Nat. Cur., XX, (1843), p. 184.

Two specimens, each about 32 mm. long and having 57 segments, seem to be quite typical in every respect.

Stations 4223, Boca de Quadra, 48-57 fathoms, soft green mud, and 4272, Afognak Bay, Afognak Island, Alaska, 12-17 fathoms, sticky mud.

CHLORHÆMIDÆ.**Trophonia papillata** Johnson.

Trophonia papillata Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, p. 416.

Silt has adhered to the bases of the cutaneous papillæ to such an extent that they appear mammilliform, and until they were examined under the microscope it was supposed that an entirely new species was in hand.

Stations 4192, Gulf of Georgia, off Nanaimo, Vancouver Island, B. C., 89-97 fathoms, green mud and fine sand; 4272, Afognak Bay, Afognak Island, Alaska, 12-17 fathoms, sticky mud.

Brada villosa (Rathke) Malmgren.

Siphonostoma villosum Rathke, Nov. Act. Acad. Cæs. Leop.-Car. Nat. Cur., XX (1843), p. 218.

No good figures of the setæ of this species have been found and the identification is based on the characters of the papillæ, tentacles, etc. Most of the specimens have the head extended. The number of segments is usually about 30, thus exceeding the number shown in Rathke's figure. The surface is coated with mucous, which becomes hard and to which sand grains adhere, producing a gritty surface, especially on the bases of the papillæ. Marenzeller records the occurrence of this species in Bering Sea.

Stations 4223, Boca de Quadra, 48-57 fathoms, soft green mud; 4272, Afognak Bay, Afognak Island, 12-17 fathoms, sticky mud.

Brada pilosa Moore.

Brada pilosa Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 231-233, Pl. X, figs. 1-17.

This is a rather common species northward. Examples occur in the collections from Stations 4194, Halibut Bank, Gulf of Georgia, 111-170 fathoms; 4198, same region, 157-230 fathoms, soft green mud; 4251 (type locality), Stephens Passage, 198 fathoms, rocky bottom; 4235, Yes Bay, Behm Canal, 130-193 fathoms, gray mud; 4252, Stephens Passage, 198-201 fathoms, gray mud, and 4258, Lynn Canal, 300-313 fathoms, mud.

STERNASPIDÆ.**Sternaspis scutata** (Ranzani) Otto.

Sternaspis scutata, Marenzeller, Ann. K. K. Nat. Hofmuseums Wien, V, (1890), p. 6.

These specimens agree exactly with those taken by the Albatross off Japan. Compared with typical examples of the species from the Mediterranean, they appear to have both the cephalic and caudal setæ more slender, and the shorter setæ of the latter region much less hairy. This appears to be due to the hairs having been rubbed off, but may possibly be a normal and constant difference. The form of the caudal plate and branchial area agrees with Marenzeller's figures.

Stations 4235, vicinity of Yes Bay, Behm Canal, Alaska, 130-193 fathoms, gray mud; 4236, same region, 147-205 fathoms, rocks and coarse sand; 4251, Stephens Passage, 198 fathoms, rocks; 4252, same region, 198-201 fathoms, gray mud; 4255, Taiya Inlet, Lynn Canal, 247-259 fathoms, rocky.

?*Sternaspis fossor* Stimpson.

? *Sternaspis fossor*, Marenzeller, Ann. K. K. Hofmuseums Wien, V, (1890), pp. 5-8.

As Johnson remarks, the *Sternaspis* from the neighborhood of Vancouver Island agrees in all respects with specimens from the Atlantic Coast. Stimpson's *S. affinis* from Puget Sound is with little doubt to be considered a synonym. It is noticeable that the lateral angles of the shield plate become more prominent on examples from the more southern stations. As represented in this collection this species attains a considerably larger size than the last, some of the specimens being 25 mm. long and 9 mm. in diameter.

Stations 4192, Gulf of Georgia, off Nanaimo, Vancouver, B. C., 89-97 fathoms, green mud and fine sand; 4194, Halibut Bank, Gulf of Georgia, 111-170 fathoms, soft green mud; 4201, Queen Charlotte Sound, off Fort Rupert, Vancouver Island, B. C., 138-145 fathoms, soft green mud, sand, broken shells; 4218, Admiralty Inlet, vicinity of Port Townsend, Washington, 16 fathoms, soft green mud; 4223, Boca de Quadra, southeastern Alaska, 48-57 fathoms, soft green mud; 4233, vicinity of Yes Bay, Behm Canal, 39-45 fathoms, soft gray mud and rocks; 4244, Kasaan Bay, Prince of Wales Island, 50-54 fathoms, green mud; 4247, same region, 89-114 fathoms, green mud, sand and broken shells.

HERMELLIDÆ.

Sabellaria cementarium Moore.

Sabellaria cementarium Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 248-253, Pl. XII, figs. 45-51.

This fine species is probably rather common and may possibly be identical with *S. californica* Fewkes, though the description of the latter fails in several respects to apply to this species. This point I hope to clear up later. The tubes, formed of agglutinated sand grains, are remarkable for their strength and hardness, and are found singly or in small clumps attached to stones.

Specimens were taken at the following stations: 4220 (type), Admiralty Inlet, near Port Townsend, Washington, 16-31 fathoms, green mud, sand and broken shells; 4247, Prince of Wales Island, 89-114 fathoms, green mud with sand and broken shells; 4274, Kadiak Island, 35-41 fathoms, green mud and fine sand; 4288, Uyak Bay, Kadiak Island, 67-69 fathoms, gray mud.

SABELLIDÆ.

Sabella formosa Bush.

Sabella formosa Bush, Tubicolous Annelids from the Pacific Ocean, Harri-man Alaska Expedition Reports, 1905, pp. 196, 197.

These examples agree well with Miss Bush's description, but differ

in having 7, 8 and 9 setigerous thoracic somites respectively. Only one is well preserved and this has nearly the entire branchiæ wine brown, deepest on the radioles and marked with white blotches. The body is 41 mm., the branchiæ 30 mm. long, the former much contracted, the latter extended.

Station 4198, Halibut Bank, Gulf of Georgia, 157-230 fathoms, soft green mud.

***Sabella elegans* Bush.**

Sabella elegans Bush, Tubicolous Annelids from the Pacific Ocean, Harriman Alaska Expedition Reports, 1905, pp. 194, 195.

A fine individual 50 mm. long with 19 pairs of branchiæ has 4 rows of very regular, deep purplish brown spots which occupy the radioles and extend more faintly on to the pinnæ of each branchia. A second smaller one has but 3 sets of spots, and a third still smaller one has them irregularly arranged.

Stations 4227, vicinity of Naha Bay, Behm Canal, southeastern Alaska, 62-65 fathoms, dark green mud and fine sand; 4260, Dundas Bay, Icy Strait, 8½-21 fathoms, coarse sand and rocks.

***Pseudopotamilla anoculata* Moore.**

Pseudopotamilla anoculata Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 566-568, Pl. XXXVII, figs. 28-33.

Known from the type only, taken at Station 4230 in the vicinity of Naha Bay, Behm Canal, 108-240 fathoms, rocky bottom.

***Pseudopotamilla splendida* Moore.**

Pseudopotamilla splendida Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 564-566, Pl. XXXVII, figs. 23-27.

Two specimens were taken at Station 4245, Kasaan Bay, Prince of Wales Island, June 11, 1903, 95-98 fathoms, dark green mud and sand mixed with shell and rock fragments.

***Pseudopotamilla intermedia* Moore.**

Pseudopotamilla intermedia Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 562-564, Pl. XXXVII, figs. 15-22.

The type only is known; originally recorded erroneously as coming from Station 4267, but really from Station 4269, Afognak Bay, Afognak Island, 14-19 fathoms, hard gray sand and rocks.

***Pseudopotamilla reniformis* (Leuckart) Bush.**

Potamilla reniformis Malmgren, Ofvers, Kgl. Vet.-Akad. Förh., 1867, p. 114.

Two specimens are each about 35 mm. long with 16 pairs of branchiæ 6 mm. long. Both have 10 setigerous thoracic segments. The branchiæ are colorless except for a brownish zone covering the basal ⅓, in which all of the eyes, never more than 1 or 2 on

each radiole, are aggregated. Several regenerating radioles bear no eyes. The dorsal branchial wing is well developed and there is a slight ventral inflection of the branchial base. The collar has well developed dorsal lobes near the median line, separated by a pair of very deep wide notches from the lateral lobes, which rise abruptly above the collar setæ. There is a little pigment on the dorsum of segments II to IV. The tube is rather soft and flexible and covered with rather coarse sand grains.

Stations 4269, Afognak Bay, Afognak Island, Alaska, 14½–19 fathoms, hard gray sand and rocks; 4271, same region, 11½–20 fathoms, hard gray sand and rock.

***Pseudopotamilla brevivbranchiata* Moore.**

Pseudopotamilla brevivbranchiata Moore, Proc. Acad. Nat. Sci. Phila., 1905, pp. 555–559, Pl. XXXVII, figs. 1–7.

Type and cotype taken at Station 4247, Kasaan Bay, Prince of Wales Island, 95–114 fathoms, mixed mud, sand and broken shells.

***Pseudopotamilla ocellata* Moore.**

Pseudopotamilla ocellata Moore, Proc. Acad. Nat. Sci. Phila., 1905, 559–562, Pl. XXXVII, fig. 8–14.

This species occurs at the following stations: 4202, off Fort Rupert, Vancouver Island, 25–36 fathoms, gray sand; 4261, Icy Strait, 10 fathoms, mud and rock; 4269 and 4270, 14–19 fathoms, hard sand and rock. The largest specimens, among them the type, are yielded by the last station listed.

***Pseudopotamilla debilis* Bush.**

Pseudopotamilla debilis Bush, Tubicolous Annelids of the Pacific Ocean, Harriman Alaska Expedition Reports, 1905, p. 204.

A single specimen lacking the posterior part represents this species. There are 16 pairs of gills 14 mm. long. Eyes appear to be totally wanting and the gills are marked by a pale brown zone near the base and another about midway of their length. The collar is remarkable for its prominent dorsal lobes. The tube is long, slender, flexible, and sparsely covered with sand grains and an occasional small pebble.

Station 4197, Gulf of Georgia, Halibut Bank, 31–90 fathoms, sticky green mud and fine sand.

***Chone gracilis* Moore.**

Chone gracilis Moore, Proc. Acad. Nat. Sci. Phila., 1906, pp. 257–259, Pl. XII, figs. 62–66.

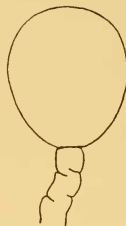
Known through the type, which comes from Station 4274, Alitak Bay, Kadiak Island, 35–41 fathoms, green mud and fine sand; and a smaller specimen taken at Station 4253, Stephens Passage, 131–188 fathoms, rocks and broken shells.

SERPULIDÆ

Apomatus geniculata Moore.

Protula geniculata Moore, Proc. Acad. Nat. Sci. Phila., 1904, pp. 168, 169, Pls. XI, figs. 17, 18; XII, fig. 38.

A small complete specimen bears 18 pairs of gills, the left dorsal-most one of which is enlarged and flattened and supports only two or three barbs. In the bottle, which contains no other specimens, is a detached operculum which exactly fits the modified radiole and without doubt belongs to this annelid, placing it therefore in the genus *Apomatus*. The operculum has the form shown in the figure, being broadly obovate or egg-shaped and quite smooth, soft and membranous. In all other respects the specimen agrees with the type. Some fragments of tubes indicate that two are sometimes coherent side by side.



Apomatus geniculata—
The operculum and
part of its stalk in
outline, $\times$ about 25.

Station 4197, Halibut Bank, Gulf of Georgia, 31-90 fathoms, soft green mud and fine sand.

Serpula columbiana Johnson.

Serpula columbiana Johnson, Proc. Bos. Soc. Nat. Hist., XXIX, pp. 432, 433.

Johnson describes the operculum as having about 100 ribs and marginal denticulations. In these specimens the number is always much greater and varies from 140 to 160. Miss Bush also has noted a larger number on her specimens. The functional operculum is developed sometimes on the right, sometimes on the left side. The accessory operculum is simply clavate. Varying with the size of the specimen the branchiæ number from 36 to 55 pairs. The setæ of the collar have from 2 to 4 large, blunt teeth at the base of the long, slender, curved tip, and the uncini are usually 5- or 6-toothed. Tubes forming a large mass coherent side by side are much thinner and more fragile than tubes found singly.

Port Townsend, on the dock at the Quarantine Station, also Station 4205, Admiralty Inlet, vicinity of Port Townsend, Washington, 15-26 fathoms, rock and shells.

Crucigera formosa Bush.

Crucigera formosa Bush, Tubicolous Annelids of the Pacific Ocean, Harri-man Alaska Expedition Reports, 1905, pp. 233, 234.

This species seems very doubtfully distinct from *C. zygophora* (Johnson). The operculum is usually 26- or 27-rayed, but one specimen has 29 and another 32 rays. The tubes are thick and solid and generally

much coiled and coherent in clumps. One isolated tube is much coiled at the attached base, with an erect free end.

Stations 4209, Admiralty Inlet, vicinity of Port Townsend, Washington, 24-25 fathoms, rocks, coarse sand and shells; 4261, Dundas Bay, Icy Strait, Alaska, $8\frac{1}{2}$ -10 fathoms, green mud and rocks; 4263, same region, $6\frac{1}{2}$ -9 fathoms, coarse sand and rocks; 4271, Afognak Bay, Afognak Island, $11\frac{1}{2}$ to 20 fathoms, hard gray sand and rock; 4283, Chignik Bay, 30-41 fathoms, black sand and brown sponge. Empty tubes, apparently of this species, were found at Stations 4202, 4204 and 4289.

***Hyalopomatopsis occidentalis* Bush.**

Hyalopomatopsis occidentalis Bush, Tubicolous Annelids of the Tribes Sabellides and Serpulides from the Pacific Ocean, Harriman Alaska Expedition Reports, 1905, p. 229.

One was found attached to a tube of *Serpula columbiana* from Station 4205, and another to a tube of *Crucigera formosa* from Station 4283.

***Spirorbis quadrangularis* Stimpson.**

Spirorbis quadrangularis Stimpson, Bush, Tubicolous Annelids of the Tribes Sabellides and Serpulides from the Pacific Ocean, Harriman Alaska Expedition Reports, 1905, p. 241.

Found on tubes of *Crucigera formosa* at Stations 4271 and 4289.

***Spirorbis spirillum* Linn.**

Spirorbis spirillum Linn., Bush, *id.*, p. 243.

Numerous specimens attached to a piece of giant kelp from Station 4262, Dundas Bay, Icy Strait, 9 fathoms, coarse sand and rocks; also a number in the collection of the Academy of Natural Sciences of Philadelphia (No. 1090), collected by Mr. E. A. McIlhenny at Point Barrow, Alaska.

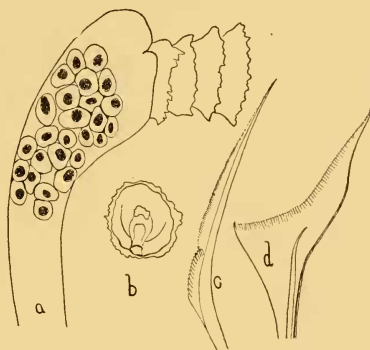
***Spirorbis tridentata* Levinsen.**

Spirorbis granulata var. *tridentata* Levinsen, Viden. Medd. Naturh. Foren., Kopenhagen, 1882, p. 350; not *S. tridentata* Bush.

The tubes of this very characteristic species agree so closely with Levinsen's figure that I refer them thereto, in preference to giving a new name founded upon the peculiarities of the worm, though it may be that the animal which occupies the tubes figured by Levinsen will prove to be quite different.

The figures of the tubes given by Levinsen would serve equally well for these. They are close, sinistral, discoid coils without any true central opening, the first coils being in contact in the center. As the tubes grow older the outer turns tend to overlap and pile upon the inner, leaving a deep central depression bounded by nearly vertical

sides. At the same time the tube, which is perfectly smooth in the early stages, becomes roughened by growth lines, and its walls become very thick, solid and stony, and are ornamented by three thick and stout ridges rounded on the free side and covering most of the outer surface of the shell. Here and there the depressions between them are crossed by transverse spurs and rods. At the aperture of the tube these ridges project as three very strong and prominent teeth. Fully developed tubes are usually 3.5 mm. in diameter and composed of 4 to $4\frac{1}{2}$ turns. The carinæ begin at the end of the third turn and Levinsen's figure very accurately represents one in a half-grown condition, in which the ridged whorl is just beginning to turn in upon the inner coils. One more turn, with the ridge characters exaggerated, would



Spirorbis tridentatus—*a*, an operculum in side view, filled with embryos and showing the imperfect four-tiered calcareous plug, $\times 24$; *b*, one of the calcareous plates detached and seen from the inner surface, $\times 24$; *c*, a collar seta, the fin at the base may be somewhat too long, $\times 600$; *d*, the two setæ of an abdominal bundle, $\times 600$.

result in a condition exactly like my full-grown tubes, in which the inner coils are completely concealed from above and the exposed parts bear massive ridges. Where free to grow without restraint the tubes are strictly discoid and the lower surface of all of the coils is in intimate contact with the alga to which they are attached, but when the individuals are crowded the coils are heaped up in various irregular and often angulated forms.

In general form the operculum (*a*) agrees well with that of *S. granulatus*, being a slender cone containing a broad pouch filled with embryos and tapering regularly into a long but rather stout stalk. The cal-

careous part, however, is remarkable, being built up of 3 or even 4 (*a*) calcareous disks of complex form (*b*). Each has a somewhat grooved rim with thin projecting flanges whose margins appear to be entire when perfect, but are usually jagged as a result of wear. It is very seldom that more than the basal disk and the one next beyond are found entire. An excentric opening prolonged into a tube on the proximal side perforates each disk obliquely dorsal to the center and accommodates the siphuncular ligament, binding all together. The number of branchiæ is about 11, but could not be definitely ascertained, owing to their being so closely matted together.

There are 3 thoracic and about 24 setigerous abdominal segments, the latter region being very short. The winged collar setæ have the form shown at *c*, the basal fin being very long, uniformly serrated and overlapping the base of the blade without an interval. The blade is very finely serrated, long, acute, and tapering. The remaining thoracic setæ are partly limbate capillary and partly serrate and sickle-shaped. Each fascicle of abdominal setæ contains but two, one being a minute aciculum with the end bent, the other having a broadly expanded end much like those of *S. spirillum* (*d*). Nothing distinctive can be detected about the uncinial plates.

The type is No. 80, collection Academy of Natural Sciences of Philadelphia, and was taken along with several cotypes at Dutch Harbor, Unalaska, by Dr. Benjamin Sharp. Attached to a tough alga frond.